

NON-PUBLIC?: N
ACCESSION #: 9308310073
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Seabrook Station PAGE: 1 OF 3

DOCKET NUMBER: 05000443

TITLE: Reactor Trip Due to Electrical Fault in Solid State
Protection System Cabinet
EVENT DATE: 07/27/93 LER #: 93-12-00 REPORT DATE: 08/26/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Mr. James M. Peschel, Regulatory COMPLIANCE: (603) 474-9521
Compliance Manager Ext. 3772

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: JG COMPONENT: LF MANUFACTURER: W120
B SN RV C568
B SN PSP U000
REPORTABLE NPRDS: YES
NO
NO

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On July 27, 1993, at 0814 an automatic reactor trip from 100 percent power occurred. This reactor trip was initiated when an electrical fault in the Train "A" Solid State Protection System (SSPS) JG! cabinet resulted in a loss of power to the undervoltage (UV) coil for the Train "A" reactor trip breaker. The deenergization of the UV coil caused Reactor Trip Breaker (RTB) "A" to open resulting in a reactor trip. Primary plant response was normal with expected Engineered Safety Feature (ESF) actuations (Emergency Feedwater System BA! actuation on Steam Generator LO-LO level and Feedwater System SJ! Isolation in response to the reactor trip). At 0939 EDT on July 27, 1993 North Atlantic made a

four-hour notification to the NRC pursuant to 10CFR50.72(b)(2)(ii) since these events resulted in a Reactor Protection System (RPS) actuation and ESF actuations.

There were no adverse safety consequences as a result of this event. Plant equipment functioned as designed in response to the reactor trip and operator actions were determined to be correct in response to the reactor trip. At no time during the event was there any adverse impact on the health and safety of plant employees or the public.

The root cause for this event was determined to be a faulty lamp test assembly in the logic test panel of the Train A SSPS cabinet. The lamp test assembly introduced a short from the SSPS auctioneered 48 VDC bus to logic ground when performing a lamp test.

Short term corrective actions completed prior to reactor startup included replacing the lamp test socket and test circuit driver card. Also a visual inspection of the remaining Train A and B SSPS lamp test sockets was performed to verify pin separation. Long term corrective actions include performing a failure analysis on the lamp test socket and to evaluate the SSPS test circuit to determine whether the potential for the failure of a single lamp test socket resulting in a reactor trip can be eliminated.

END OF ABSTRACT

TEXT PAGE 2 OF 3

Description of Event

On July 27, 1993, at 0814 an automatic reactor trip from 100 percent power occurred. This reactor trip was initiated when an electrical fault in the Train "A" Solid State Protection System (SSPS)JG! cabinet resulted in a loss of power to the undervoltage (UV)27! coil for the Train "A" reactor trip breaker. The deenergization of the UV coil caused Reactor Trip Breaker (RTB) "A" to open resulting in a reactor trip.

On July 27, 1993 at approximately 0800 Instrumentation and Control (I&C) technicians began performing IX1680.921, SSPS "A" Train Logic Test. IX1680.921 is the bimonthly surveillance procedure used to test the actuation logic of the Train A SSPS cabinet. During a lamp test on the logic test panel, early in the procedure, one lamp was identified as being "burned-out". The lights are tested by depressing the lamp into the socket and verifying a lit condition. After completing the initial check, the non-functioning lamp was checked a second time to verify that it was a burned out bulb and not a bad connection. The reactor trip occurred an instant after the lamp was depressed a second time.

The response to the reactor trip and the subsequent recovery actions by plant operators were determined to be correct. Primary plant response was normal with expected Engineered Safety Feature (ESF) actuations (Emergency Feedwater System BA! actuation on Steam Generator LO-LO level and Feedwater System SJ! Isolation in response to the reactor trip). However, during the secondary plant response approximately six minutes after the reactor trip, the tube side relief valve (1-MVD-V-132) for the 26B feedwater heater ruptured and an upstream small bore pipe failed at an elbow upstream of the valve. This valve failure did not adversely affect the response of the plant to the reactor trip. The valve and piping were repaired prior to plant startup. The problem with the valve during a secondary plant transient had been previously identified and a design change is scheduled to be installed during the next refuel outage to resolve the problem.

At 0939 EDT on July 27, 1993 North Atlantic made a four-hour notification to the NRC pursuant 10CFR50.72(b)(2)(ii) since this event resulted in an RPS and ESF actuations.

Safety Consequences

There were no safety consequences as a result of this event. Plant equipment functioned as designed in response to the reactor trip and operator actions were determined to be correct in response to the reactor trip. At no time during the event was there any adverse impact on the health and safety of plant employees or the public.

Root Cause

The root cause for this event was determined to be a faulty lamp test assembly in the logic test panel of the Train A SSPS cabinet. The lamp test assembly introduced a short from the SSPS auctioneered 48 VDC bus to logic ground when performing a lamp test. The 48 VDC is used as "pull-up" voltage for SSPS contact inputs, including permissive and memory ground inputs. The fault reduced the 48 VDC bus voltage which allowed contact inputs to the universal logic cards to drop out causing a SSPS logic input to be sensed. The voltage drop also affected the output on some

TEXT PAGE 3 OF 3

(Continued)

universal circuits causing additional state changes in the system. The fault caused the 48 VDC to RTB "A" UV coil to drop out which in turn opened the breaker tripping the reactor. The UV coil is designed to drop out if

it senses a voltage drop for longer than approximately 12 milliseconds.

Corrective Actions

Short term corrective actions completed prior to reactor startup included replacing the lamp test socket and the semiautomatic tester card. Also a visual inspection of the remaining Train A and B SSPS lamp test sockets was performed to verify pin separation and proper power output from both power supplies. Long term corrective actions include performing a failure analysis of the lamp test assembly, an evaluation of the SSPS test circuit to determine whether the potential for the failure of a single lamp socket resulting in a reactor trip can be eliminated, an evaluation of procedure IX1680.921 and similar test procedures to determine if the lamp test can be performed after the bypass breakers are closed, and an inspection of similar lamp sockets to determine if there is a generic problem.

Plant Conditions

This event took place while the plant was in MODE 1, at 100 percent power, with a Reactor Coolant System AB! temperature of 587 degrees Fahrenheit and a pressure of 2235 psig.

Previous Occurrences

This is the first event of this type at Seabrook Station.

ATTACHMENT 1 TO 9308310073 PAGE 1 OF 2

North P.O. Box 300
Atlantic Facsimile (603)474-2987
Energy Service Corporation Seabrook, NH 03874
Telephone (603) 474-9521

Ted C. Feigenbaum
Senior Vice President and
Chief Nuclear Officer

NYN- 93116

August 26, 1993

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Reference: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: Licensee Event Report (LER) 93-12-00: "Reactor Trip Due to Electrical Fault in Solid State Protection System Cabinet"

Gentlemen:

Enclosed is Licensee Event Report (LER) No. 93-12-00 for Seabrook Station. This submittal documents an event which was discovered on July 27, 1993. This event is being reported pursuant to 10CFR50.73(a)(2)(iv).

Should you require further information regarding this matter, please contact Mr. James M. Peschel, Regulatory Compliance Manager at (603) 474-9521 extension 3772.

Very truly yours,

Ted C. Feigenbaum

TCF:EWM/act

Enclosures: NRC Forms 366/366A

a member of the Northeast Utilities system

ATTACHMENT 1 TO 9308310073 PAGE 2 OF 2

United States Nuclear Regulatory Commission August 26, 1993
Attention: Document Control Desk Page two

cc: Mr. Thomas T. Martin
Regional Administrator
U.S. Nuclear Regulatory Commission
Region I 475
Allendale Road
King of Prussia, PA 19406

Mr. Albert W. De Agazio, Sr. Project Manager
Project Directorate I-4
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. Noel Dudley
NRC Senior Resident Inspector

P.O. Box 1149
Seabrook, NH 03874

INPO
Records Center
700 Galleria Parkway
Atlanta, GA 30339-5957

*** END OF DOCUMENT ***
